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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/978,184	10/17/2001	Ronald E. Laird	3691-308	3917

7590 08/05/2002

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EXAMINER

PIZIALI, ANDREW T

ART UNIT	PAPER NUMBER
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1775

DATE MAILED: 08/05/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

AS-7

Office Action Summary

Application No.

09/978,184

Applicant(s)

LAIRD, RONALD E.

Examiner

Andrew T Piziali

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the corresponding address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 October 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-40 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-40 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5,6 6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 7, 9, 11-13, 15-16, 21, 23-24, 27-31, 35, 37 and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No. 6,060,178 to Krisko in view of US Patent 5,935,702 to Macquart et al. (hereinafter referred to as Macquart).

Regarding claims 1, 7, 9, 11-13, 15-16, 21, 23-24, 27-31, 35, 37 and 39 Krisko discloses a coated article comprising a substrate (12), and a coating supported by the substrate comprising an antireflection layer of silicon nitride (60), a layer of silver (42), an antireflection layer of silicon nitride (64), a layer of silver (44), and a layer of silicon nitride (62) (column 7, lines 16-34 and Figure 3). Krisko discloses the use of a zinc oxide layer below each silver layer and a protective barrier niobium layer above each silver layer (column 7, lines 16-34 and Figure 3).

Krisko fails to mention substituting a nickel/chromium oxide layer for each niobium layer, but Macquart discloses the use of either a niobium layer or a nickel/chromium layer over a silver layer to protect the silver layer (column 6, lines 8-16). Macquart further discloses that the nickel/chromium layer is oxidized by sputtering in the presence of oxygen (column 6, lines 20-21). It would have been obvious to one having ordinary skill in the art at the time the invention was made to substitute a nickel/chromium oxidized layer for the niobium layers of Krisko, as

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disclosed by Macquart, because nickel/chromium oxidized layers are functionally equivalent to niobium layers as sacrificial layers meant to protect the silver layers.

Krisko discloses that the silicon nitride layers (16 and 24) serve as antireflection layers (column 5, lines 31-38). Krisko fails to specifically mention substituting titanium oxide or tin oxide for the antireflection layers of silicon nitride, but the examiner takes Official Notice that silicon nitride, titanium oxide, and tin oxide are all well known in the art as high refractive index materials. It would have been obvious to one having ordinary skill in the art at the time the invention was made to make the antireflection layers of Krisko (60,62, and 64) from any suitable high refractive index material, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of design choice.

Considering the substantially identical coated article of the cited prior art compared to the applicants' coated article, in terms of composition of the layers, layer thicknesses and method of making the layers, it appears that the coated article would possess all the material properties claimed by the applicant. This reasoning holds for all subsequent rejections.

Regarding claim 35, Krisko discloses that the layers may be deposited by sputtering (column 4, lines 14-18).

3. Claims 2, 4-5, 10, 17-19, 25-26, 33 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Krisko in view of Macquart as applied to claims 1, 7, 9, 11-13, 15-16, 21, 23-24, 27-31, 35, 37 and 39 above, and further in view of US Patent No. 5,800,933 to Hartig et al. (hereinafter referred to as Hartig '933).

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Regarding claims 2, 4-5, 10, 17-19, 25-26, 33 and 40, Krisko discloses that the coated article may be used in automobiles or as architectural glass, but fails to specifically mention using the article as an IG window unit. Hartig '933 discloses that it is known in the art to use a solar control coated glass article in IG window units to provide insulating properties (column 1, lines 21-58). It would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the coated article of Krisko into an IG window unit, because the unit provides insulating properties desirable in many architectural applications.

4. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Krisko in view of Macquart in view of Hartig '933 as applied to claims 2, 4-5, 10, 17-19, 25-26, 33 and 40 above, and further in view of US Patent No. 6,398,925 to Arbab et al. (hereinafter referred to as Arbab).

Regarding claim 20, Krisko discloses that besides a zinc oxide film other oxide films may be utilized for layers (50, 52, 54, 56) (column 7, lines 46-55), but fails to specifically mention doping at least one zinc oxide layer with aluminum. Arbab discloses that either zinc oxide or aluminum doped zinc oxide may be used above a silver layer to protect the silver layer and improve adhesion (column 5, lines 22-33, column 6, lines 18-37 and lines 42-68). It would have been obvious to one having ordinary skill in the art at the time the invention was made to make any of the zinc oxide layers of Krisko from any suitable material capable of protecting the silver layers and improving adhesion between layers, such as aluminum doped zinc oxide, as disclosed by Arbab, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of design choice.

5. Claims 3, 6, 8, 22, 32, 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Krisko in view of Macquart as applied to claims 1, 7, 9, 11-13, 15-16, 21, 23-24, 27-31, 35, 37

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and 39 above, and further in view of US Patent No. 6,398,925 to Arbab et al. (hereinafter referred to as Arbab).

Regarding claims 3 and 6, Krisko discloses the use of a zinc oxide layer (56) below the silicon nitride overcoat layer (62), but fails to specifically mention the substitution of a tin oxide layer for the zinc oxide layer. Arbab discloses that either zinc oxide or tin oxide may be used above a silver layer to protect the silver layer and improve adhesion (column 5, lines 22-33, column 6, lines 18-37 and lines 42-68). It would have been obvious to one having ordinary skill in the art at the time the invention was made to make the zinc oxide layer (56) from any suitable material capable of protecting the silver layer and improving adhesion between layers, such as tin oxide, as disclosed by Arbab, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of design choice

Krisko discloses the following layer thickness ranges (column 4, lines 60-67 and column 7, lines 1-34):

first antireflection layer (60) thickness ranging from 50-300 Å

zinc oxide layers (50, 54, 52, and 56) of thickness ranging from 25-180 Å

first silver layer thickness (42) ranging from 60-100 Å

protective barrier layers (46 and 48) thickness ranging from 7-20 Å

second antireflection layer (64) thickness ranging from 100-800 Å

second silver layer (44) thickness ranging from 130-170 Å

silicon nitride layer (62) thickness ranging from 100-400 Å

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Krisko also discloses that the thicknesses may be adjusted to obtain the desired transmissivity and emissivity (column 7, lines 6-8).

Regarding claims 6, 8, 22, 32 and 38, Krisko discloses that besides a zinc oxide film other oxide films may be utilized (column 7, lines 46-55), but fails to specifically mention doping at least one zinc oxide layer with aluminum. Arbab discloses that either zinc oxide or aluminum doped zinc oxide may be used above a silver layer to protect the silver layer and improve adhesion (column 5, lines 22-33, column 6, lines 18-37 and lines 42-68). It would have been obvious to one having ordinary skill in the art at the time the invention was made to make any of the zinc oxide layers of Krisko from any suitable material capable of protecting the silver layers and improving adhesion between layers, such as aluminum doped zinc oxide, as disclosed by Arbab, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of design choice.

6. Claims 14, 34, 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Krisko in view of Macquart as applied to claims 1, 7, 9, 11-13, 15-16, 21, 23-24, 27-31, 35, 37 and 39 above, and further in view of US Patent No. 6,277,480 to Veerasamy et al. (hereinafter referred to as Veerasamy).

Regarding claims 14, 34 and 36, Krisko does not mention providing a final coat of DLC on the coated article, but Veerasamy discloses that it is known to coat vehicle windows/windshields or architectural glass with DLC to provide scratch resistance and improve durability. It would have been obvious to one having ordinary skill in the art at the time the invention was made to coat the article of Krisko with a DLC layer, because it would provide scratch resistance and improve durability.

Regarding claim 36, Veerasamy discloses that the DLC layer may be deposited by an ion beam deposition method (paragraph bridging columns 6 and 7).

7. Claims 1, 7, 9, 11-13, 15-16, 21, 23-24, 27-31, 35, 37 and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No. 6,060,178 to Krisko in view of US Patent 5,376,455 to Hartig et al. (hereinafter referred to as Hartig '455).

Regarding claims 1, 7, 9, 11-13, 15-16, 21, 23-24, 27-31, 35, 37 and 39 Krisko discloses a coated article comprising a substrate (12), and a coating supported by the substrate comprising an antireflection layer of silicon nitride (60), a layer of silver (42), an antireflection layer of silicon nitride (64), a layer of silver (44), and a layer of silicon nitride (62) (column 7, lines 16-34 and Figure 3). Krisko discloses the use of a zinc oxide layer below each silver layer and a protective barrier niobium layer above each silver layer (column 7, lines 16-34 and Figure 3).

Krisko fails to mention substituting a nickel/chromium oxide layer for each niobium layer, but Hartig '455 discloses the use of nickel/chromium oxidized layers on silver layers to improve adhesion between respective layers and to protect the silver layers (paragraph bridging columns 3 and 4, column 9, lines 23-27 and lines 34-47). It would have been obvious to one having ordinary skill in the art at the time the invention was made to substitute a nickel/chromium oxidized layer, as disclosed by Hartig '455, for each niobium layer of Krisko, because nickel/chromium oxidized layers are functionally equivalent as sacrificial layers meant to protect the silver layers.

Krisko discloses that the silicon nitride layers (16 and 24) serve as antireflection layers (column 5, lines 31-38). Krisko fails to specifically mention substituting titanium oxide or tin oxide for the antireflection layers of silicon nitride, but the examiner takes Official Notice that

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silicon nitride, titanium oxide, and tin oxide are all well known in the art as high refractive index materials. It would have been obvious to one having ordinary skill in the art at the time the invention was made to make the antireflection layers of Krisko (60,62, and 64) from any suitable high refractive index material, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of design choice.

Regarding claim 35, Krisko discloses that the layers may be deposited by sputtering (column 4, lines 14-18).

8. Claims 2, 4-5, 10, 17-19, 25-26, 33 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Krisko in view of Hartig '455 as applied to claims 1, 7, 9, 11-13, 15-16, 21, 23-24, 27-31, 35, 37 and 39 above, and further in view of US Patent No. 5,800,933 to Hartig et al. (hereinafter referred to as Hartig '933).

Regarding claims 2, 4-5, 10, 17-19, 25-26, 33 and 40, Krisko discloses that the coated article may be used in automobiles or as architectural glass, but fails to specifically mention using the article as an IG window unit. Hartig '933 discloses that it is known in the art to use a solar control coated glass article in IG window units to provide insulating properties (column 1, lines 21-58). It would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the coated article of Krisko into an IG window unit, because the unit provides insulating properties desirable in many architectural applications.

9. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Krisko in view of Hartig '455 in view of Hartig '933 as applied to claims 2, 4-5, 10, 17-19, 25-26, 33 and 40

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above, and further in view of US Patent No. 6,398,925 to Arbab et al. (hereinafter referred to as Arbab).

Regarding claim 20, Krisko discloses that besides a zinc oxide film other oxide films may be utilized for layers (50, 52, 54, 56) (column 7, lines 46-55), but fails to specifically mention doping at least one zinc oxide layer with aluminum. Arbab discloses that either zinc oxide or aluminum doped zinc oxide may be used above a silver layer to protect the silver layer and improve adhesion (column 5, lines 22-33, column 6, lines 18-37 and lines 42-68). It would have been obvious to one having ordinary skill in the art at the time the invention was made to make any of the zinc oxide layers of Krisko from any suitable material capable of protecting the silver layers and improving adhesion between layers, such as aluminum doped zinc oxide, as disclosed by Arbab, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of design choice.

10. Claims 3, 6, 8, 22, 32, 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Krisko in view of Hartig '455 as applied to claims 1, 7, 9, 11-13, 15-16, 21, 23-24, 27-31, 35, 37 and 39 above, and further in view of US Patent No. 6,398,925 to Arbab et al. (hereinafter referred to as Arbab).

Regarding claims 3 and 6, Krisko discloses the use of a zinc oxide layer (56) below the silicon nitride overcoat layer (62), but fails to specifically mention the substitution of a tin oxide layer for the zinc oxide layer. Arbab discloses that either zinc oxide or tin oxide may be used above a silver layer to protect the silver layer and improve adhesion (column 5, lines 22-33, column 6, lines 18-37 and lines 42-68). It would have been obvious to one having ordinary skill in the art at the time the invention was made to make the zinc oxide layer (56) from any suitable

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material capable of protecting the silver layer and improving adhesion between layers, such as tin oxide, as disclosed by Arbab, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of design choice

Krisko discloses the following layer thickness ranges (column 4, lines 60-67 and column 7, lines 1-34):

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Krisko also discloses that the thicknesses may be adjusted to obtain the desired transmissivity and emissivity (column 7, lines 6-8).

Regarding claims 6, 8, 22, 32 and 38, Krisko discloses that besides a zinc oxide film other oxide films may be utilized (column 7, lines 46-55), but fails to specifically mention doping at least one zinc oxide layer with aluminum. Arbab discloses that either zinc oxide or aluminum doped zinc oxide may be used above a silver layer to protect the silver layer and improve adhesion (column 5, lines 22-33, column 6, lines 18-37 and lines 42-68). It would have been obvious to one having ordinary skill in the art at the time the invention was made to make any of the zinc oxide layers of Krisko from any suitable material capable of protecting the silver

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layers and improving adhesion between layers, such as aluminum doped zinc oxide, as disclosed by Arbab, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of design choice.

11. Claims 14, 34, 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Krisko in view of Hartig '455 as applied to claims 1, 7, 9, 11-13, 15-16, 21, 23-24, 27-31, 35, 37 and 39 above, and further in view of US Patent No. 6,277,480 to Veerasamy et al. (hereinafter referred to as Veerasamy).

Regarding claims 14, 34 and 36, Krisko does not mention providing a final coat of DLC on the coated article, but Veerasamy discloses that it is known to coat vehicle windows/windshields or architectural glass with DLC to provide scratch resistance and improve durability. It would have been obvious to one having ordinary skill in the art at the time the invention was made to coat the article of Krisko with a DLC layer, because it would provide scratch resistance and improve durability.

Regarding claim 36, Veerasamy discloses that the DLC layer may be deposited by an ion beam deposition method (paragraph bridging columns 6 and 7).

Conclusion

12. The following patents are cited to further show the state of the art with respect to commonly known high refractive index materials:

US Patent No. 5,965,246 to Guiselin et al. (specifically column 5, lines 9-27)

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew T Piziali whose telephone number is (703) 306-0145.

The examiner can normally be reached on Monday-Friday (8:00-4:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Deborah Jones can be reached on (703) 308-3822. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 306-5665.



atp
July 26, 2002

Andrew T Piziali
Examiner
Art Unit 1775



DEBORAH JONES
SUPERVISORY PATENT EXAMINER